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# ETHNOBOTANICAL UNDERSTANDING OF MANGROVES: AN INVESTIGATION FROM CENTRAL PART OF INDIAN SUNDARBANS

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## ABSTRACT

Mangroves are one of the most unique ecosystems existing in the estuarine regions of the tropical and subtropical zone. Sundarbans is the largest, yet heavily populated, contiguous mangrove forest of the world which is shared by two nations, namely Bangladesh and India. Local inhabitants face tremendous austerity from environmental problems, but are dependent on forest plants for their medical requirements along with other day-to-day uses, in scarcity of modern medical facility coupled with transportation difficulties. This paper highlights the medicinal usage of few key mangrove species as indicated by local healers and medicine man. A total of 31 species of mangrove flora is found to have different medicinal properties, and other usage which is put forward in this paper.

**KEYWORDS:** Medicinal Plants, Ethnobotany, Mangroves, Indian Sundarbans

## INTRODUCTION

Mangroves are coastal forests found in sheltered estuaries and along river banks and lagoons in the tropics and subtropics (Maiti and Chowdhury, 2013).The term 'mangrove' describes both the ecosystem and the plant families that have developed specialized adaptations to live in this tidal environment (Tomlinson 1986). Its multifaceted role, including the interactive relationship with the neighboring habitat and sheltering diverse species, has made it a treasured storehouse of the nature particularly production of fish and shellfish. Mangroves are one of the most productive ecosystems that enrich coastal waters, yield commercial forest products, protect coastlines, and even support coastal fisheries and storehouse of numerous endangered faunas (like *Panthera tigris tigris*,dolphin, otters, manatees and numerous avian species like egrets, pelicans, eagles) (Kathiresan and Bingham 2001; FAO 2007). Mangroves act as an effective carbon sink (Komiyama et al., 2008) and sequester higher amount of $CO_2$ (than any other non-mangrove forest types) which approximately amounts to 100 tons of $CO_2$ per hector (Ha) and also stabilize the soil particles to control erosion (Harty 1997).

There is a constant debate going on, on the approaches of conservation. Indigenous knowledge is now recognized by major international conservation bodies, and the importance of traditional way of ecosystem management is an emerging discipline of research. According to United Nations Declaration on the Rights of Indigenous Peoples, 2008, Article 31, Section 1, "*Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions…..*"The ecological foundation that is the base of any conservation measure is a complex interaction between the human, flora, fauna, natural forces and land forms unique for the ecoregion (Kassam et al. 2010). So to effective draw a conservation plan for an ecosystem, the intricate balance between these interaction should be taken into consideration.

Ethnically Indian Sundarbans is dominated by Scheduled caste and Scheduled tribes (Chowdhury and Maiti, 2014). Sunderban *Bada-Ban* is infamous to the settlers due to the environmental austerity but, it is also a repository of medicinal plants having immense ethno-botanical significance. Local populace is dependent on these plants for remediation of wide variety of ailments and uses them as food supplement. This knowledge of the ethnobotanical potential is passed down from generation to generation as a folk tradition in the settler community of Sundarbans. The difficulty in transport and lack of medicinal care in the area have compelled the populace to divert their attention to locally available medication and in acceptance of different mystic rituals associated with materials derived from mangrove flora.

## STUDY AREA

Study site is central parts of Indian sundarbans, comprising of Jharkhali, Herobhanga Island, and Ajmalbari Range, which enjoys almost a central position in Indian Sundarban. Here the environmental parameters are optimum. Overlooking it is Sajnekhali Sanctuary in West. Ethnobotanical study is conducted in Gopalpur village (22$^{o}$ 03’ 41” N Latitude/ 88$^{o}$ 37’ 27” E Longitude) and Tridipnagar village (22$^{o}$ 01’ 51” N Latitude/ 88$^{o}$ 42’ 44” E Longitude), which is indicated in Figure 1.

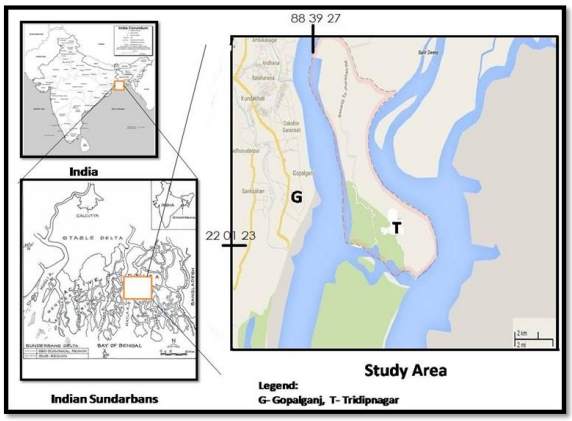


**Figure 1: Study Area-Tridipnagar and Gopalganj**

## ETHNOBOTANICAL SURVEY

Semi-structured interviews based on note-taking is employed while interviewing the 25 informants (Martin, 1995; Maundu, 1995), and 10informants are brought to Jharkhali mangrove eco-garden (JMEG) at Jharkhali (http://mangrove-ecogarden.org.in/ ), recognized by botanic garden conservation international, for identification of the plants that are not easily available or sighted in natural habitat. Plant specimens, as pointed out by the informants namely peer baba (Islamic aesthetics) and gunins/ ojha/ kaviraj (traditional medicine man and aesthetic healers), were collected and brought to JMEG where they have identified by comparing the plants with their existing plants of the garden which are already identified by competent authorities as a part of in-situ conservation programme of the Calcutta Wildlife Society**.**

## RESULTS AND DISCUSSIONS

Ethnobotanical study was conducted amongst the traditional healers and the plants used by them are collected and identified. In absence of proper medicinal facilities, the local populace is dependent on these traditional healers for their immediate treatment. The main plants and parts used and their botanical specifications are given in table 1.

**Table 1: Mangrove Plants/Botanical Families and their Ethnobotanical Usage**

| Sl. No | Scientific Name (Family) | Local Name | Habit | Parts Used | Medicinally Important Properties |
|---|---|---|---|---|---|
| 1 | *Acanthus illicifolius* L. (Acanthaceae) | Horgoja | Shrub | Leaves, Root | Leaves are traditionally used for treating Tiger bites. Roots are boiled and extract used to treat various diseases like asthma, paralysis, leucorrhoea and debility. |
| 2 | *Acanthus volubilis* L. (Acanthaceae) | Lota Horgoja | Climber | Leaves | Leaves are dried and taken as an remedy for stomach ulcer. |
| 3 | *Acrostichum aurium* L. (Pteridaceae) | Hudo | Shrub/ Understory | Rhizome | Rhizome paste is used to treat boils and carbuncles. |
| 4 | *Atalantia correa* Roem (Rutaceae) | Bon Lebu | Herb | Fruit | Oil from the fruit is useful for treatment of rheumatism. |
| 5 | *Avicennia marina* (Forssk.) Vierh. (Avicenniaceae) | Peyara bani | Tree | Fruit | Bitter aromatic juice is used in a concoction to facilitate abortion. Mainly used by tribal population that settled in sundarbans during British colonial period. |
| 6 | *Avicennia officinalis* L.(Avicenniaceae) | Kalo Bani | Tree | Fruit, Seed | Seed bitter, but edible. Unripe fruit is used as a remedy to treat boils. |
| 7 | *Bruguiera gymnorrhiza* Lamk. (Rhizophoraceae) | Kankra | Tree | Bark | Bark is macerated and the extract is said to be useful in controlling diarrhea |
| 8 | *Bruguiera*. *sexangula* Poir. (Rhizophoraceae) | Kankra | Tree | Bark | Bark is macerated and the extract is used to controls diarrhea |
| 9 | *Casytha filiformis* L. (Lauraceae) | Akash Bel | Parasite | Fruit | Fruit extract is used to treat sexually transmitted diseases, eruption in pubic region and is also used for treatment of erectile dysfunction in adults. Said to have mystical properties by Muslim traditional healers (Pir baba). |
| 10 | *Ceriops decandra* (Griff.) | Garan | Shrub | Stem | The poles of the |

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| | Ding Hou(Rhizophoraceae) | | | | stem is used as fencing material. |
| 11 | *Ceriops tagal* (Perr.) Robinson(Rhizophoraceae) | Mat-Garan | Shrub | Bark | Stem bark extract is used to stop hemorrhages. It is said that bark is useful for ailment that resembles peptic ulcers. The poles of the stem is used as fencing material. |
| 12 | *Clerodendrum inerme* Gaertn.(Verbenaceae) | Bon-Jui | Shrub | Leaves | It contains bitter extract that is used as febrifuge. |
| 13 | *Derris trifoliate* Roxb. (Fabaceae) | Chuliakanta | Climber | Root | Root is dried and powered and used to treat person affected by chronic alcoholism, useful as stimulant and antispasmodic. |
| 14 | *Dolichandrone spathaceae* (L.) Schum (Bignoniaceae) | Gorshin-giah | Shrub | Seed | Seed powder is used as antiseptic and in enteric spasms. |
| 15 | *Excoecaria agallocha* L. (Euphorbiaceae) | Genwa | Tree | Latex | Latex is acrid and poisonous. In local myth, it is said to be blessed by snake god "Manasha". |
| 16 | *Finlaysonia obovata* Wall. (Apocyanaceae) | Panlota | Climber | Leaf | Leaf is dried and crushed to be used as a remedy for dysentery. |
| 17 | *Heliotropium curassavicum* L. (Boraginaceae) | Nona Hatisur | Herb | Root | Root is dried, grinded and the powder used for treating wounds, cuts external ulcers. |
| 18 | *Heritiera fomes* Buch-Ham. (Malvaceae) | Sundari | Tree | Seed | Seed is grounded and used to treat dysentery. |
| 19 | *Hibiscus tiliaceous* L. (Malvaceae) | Bhola | Herb | Leaf,Bark,Root, Seed | Leaf extract is used as laxative. Bark mucilage is used to treat dysentery like symptoms'. Root is used to prepare herbal tonic for treatment of rheumatism. Seed is used as an ematic. |
| 20 | *Kandelia candel* (L.) Druce (Rhizophoraceae) | Goria | Shrub | Leaf | Medicinally useful in the treatment of problems related to frequent urination. |
| 21 | *Lumnitzera racemosa* Willd (Combretaceae) | Kripal | Shrub | Stem | Fluid from the stem is used to treat rashes, itch. |
| 22 | *Nypa fruticans* Wurmb. (Arecaceae) | Golpata | Shrub | Fruit | Production of alcohol is done by |

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| | | | | | fermenting fruit pulp. |
| 23 | *Pentatropis capensis* (L.f) Bullock (Asclepiadaceae) | Dudhilata | Climber | Latex | Latex of the stem is used to treat minor burns. |
| 24 | *Phoenix padulosa* Roxb. (Arecaceae) | Hetal | Shrub | Fruit | The fruit pulp is said to have a property that reduce inflammation and used during persistent fevers. |
| 25 | *Scyphiphora hydrophyllaceae* Gaert. (Rubiaceae) | Tagri Bani | Shrub | Shoot | Shoot extract is warmed slightly and used for enteric diseases and also used to treat liver ailments. |
| 26 | *Sonneratia apetala* Buch-Ham. (Sonneratiaceae) | Keora | Tree | Fruit | Fruit is used as spice and to improve flavor of cooking. |
| 27 | *Sonneretia caseolaris* Engler. (Sonneratiaceae) | Chak Keora | Tree | Fruit | Fruits edible and is used to prepare a local cuisine and is valued for it's sour taste. Fruit extract is used as an anthelmintic medicine. |
| 28 | *Sonneretia griffithii* Kurz. (Sonneratiaceae) | Ora | Tree | Fruit | Fruit is used as spice and to improve flavor of cooking. |
| 29 | *Tylophora tenuis* Blume. (Asclepediaceae) | Antomul | Herb | Stem, Leaves | Plant decoction is used to treat bile/liver problems and perpiration. |
| 30 | *Xylocarpus granatum* Koenig. (Meliaceae) | Dhudul | Tree | Bark | Bark extract is used to treat dysentery. Wood is durable and is suitable for making furniture. |
| 31 | *Xylocarpus mekongensis* Pierre. (Meliaceae) | Pasur | Tree | Bark | Bark extract is used to treat dysentery. Wood is durable and is suitable for making furniture. |

These remedial and healing effects of resident flora is used by the local populace since the times of the initial settlement in sundarbans, but is now in jeopardy due to the lack of availability of the natural product owing to stringent conservation measures and due to the advent of few western medical centers in the Sundarban islands. So this constant tussle between tradition, culture and development is a normal occurrence like in other indigenous communities worldwide (Matavele and Habib, 2000).

## CONCLUSIONS

The ethnobotanical investigation reveals the traditional uses of thirty one species of mangrove flora. It is seen that these plant parts are used in variety of ailments including ulcers, boils, stomach problems, urinary diseases and many

others. Growth of modern medicine along with the cultural transgression of developing society with constrains imposed on resource utilization due to conservation issues, is putting these ancient traditions under enormous stress. But these practices shed light into the hidden aspects of utilization of different natural products from plants, which can be benefitting to humans and can pave the way for development of different sustainable medicinal products with minimum post-therapeutic complications.

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